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OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314				
EXAMINER				
TSANG FOSTER, SUSY N				
ART UNIT		PAPER NUMBER		
1745				

DATE MAILED: 06/03/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.	Applicant(s)
10/057,913	AIHARA ET AL.
Examiner	Art Unit
Susy N Tsang-Foster	1745

— The MAILING DATE of this communication appears on the cover sheet with the correspondence address —  
Period for Reply

## A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
  - If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
  - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
  - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED. (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 22 March 2004.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1,2,5-7 and 9-28 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,2,5-7 and 9-28 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Orefsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB.08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Response to Amendment***

1. This Office Action is responsive to the amendment filed on 3/22/2004. Claims 1, 2, 5, 6, 7, and 9-15 have been amended and claims 27 and 28 have been added. Claims 3, 4, and 8, have been cancelled. In the amendment filed on 3/22/2004, changes have been made to claims 5 and 6 that have not been underlined. It is noted in claim 5 that the phrase "a volume ratio" has been changed to "the volume ratio" and in claim 6, the phrase "a volume ratio" has been changed to "the volume ratio".

Previous art rejections based on Kawakami et al. (US 5,824,434) are withdrawn in view of applicant's arguments and the amendment to claim 15 reciting a porous adhesive resin layer. Previous art rejections based on Dasgupta et al. '389 and Dasgupta et al'489 are withdrawn in view of the amendment to claim 1 reciting a porous adhesive resin layer. Claims 1, 2, 5-7, and 9-28 are pending and are finally rejected for reasons necessitated by applicant's amendment.

### ***Terminal Disclaimer***

2. The terminal disclaimer filed on 10/30/2003 disclaiming the terminal portion of any patent granted on this application which would extend beyond the expiration date of U.S. Pat. No. 6,387,565 has been reviewed and is accepted. The terminal disclaimer has been recorded.

*Specification*

3. The abstract of the disclosure is objected to because it should be one paragraph.

Correction is required. See MPEP § 608.01(b).

*Claim Rejections - 35 USC § 112*

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 1, 2, 5-7, and 9-28 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claims 1 and 15, the limitation "through which ions pass" is indefinite because it is unclear what these ions are.

Claims depending from claims rejected under 35 USC 112, second paragraph are also rejected for the same.

*Claim Rejections - 35 USC § 102*

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7. Claims 1, 2, 5-7, and 9-12 are rejected under 35 U.S.C. 102(a) as being anticipated by WO 97/08763 (equivalent document US Pat. No. 6,287,720 B1 relied upon for translation).

WO 97/08763 discloses a battery comprising a battery body comprising a positive electrode and a negative electrode each containing an active material; two separators holding an electrolyte wherein each of the two separators contain inorganic fillers that render the separators porous to provide passages through which ions pass (See abstract; Figure 5; col. 3, lines 5-39, col. 4, lines 20-40). In particular, Figure 5 shows a porous separator (13A, 13B) which is directly formed in an immobilized form on the positive electrode 11 and on the negative electrode 12. Each of the porous separators comprises at least one layer of an aggregate form of particles of at least one insulating substance (which is non-electrically conductive) and a binder which is mixed with the particles to thereby bind the particles together the layer of the aggregate form of particles having a three-dimensional network of voids which function as pores in the porous separator and which are capable of passing ions therethrough (col. 3, lines 30-38). The insulating substance (the filler) may be either an inorganic substance or an organic substance and examples of inorganic substances include oxides, zeolite, nitrides, silicon carbide, zircon, polyethylene, polypropylene, and fluororesins (col. 6, lines 58-67 and col. 7, lines 1-17). The average particle diameter of the insulating substance is preferably from 5 nm to 1 micron (col. 7, lines 46-50). The thickness of the porous separator is preferably from 100 nm to 10 micron (col. 7, lines 46-55). The porosity of each of the separator is most preferably 40% (see col. 8, lines 32-45) which is the sum of the volume ratio of the binder in the separator and that of the filler

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per unit volume of the separator layer having a value of 0.4). The battery can be a lithium ion secondary battery (col. 10, lines 12-20) in which case the electrolyte contains lithium ions. The reference also discloses that in a lithium-ion battery, the battery is designed to have a construction in which a plurality of unit cells are laminated or a construction in which a unit cell is spirally wound into a spirally wound structure.

When the unit cells are laminated, the separators 13A and 13 B would also be laminated. After lamination, the separator 13B would be an adhesive resin layer for the anode to separator 13A and the separator 13A would be an adhesive resin layer for the cathode to separator 13 B.

The surfaces of electrodes and separators are inherently uneven because no surface is perfectly flat. The separator 13B would fill any voids between the anode and separator 13A after lamination and the separator 13 A would fill any voids between the cathode and separator 13B after lamination.

*Claim Rejections - 35 USC § 103*

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 1, 2, 5, 7, and 9-12 are rejected under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Chen et al. (US Pat. No. 5,741,609).

The product-by-process limitations of claims 1, 2, 5, 7, and 9-12 are not given patentable weight since the courts have held that patentability is based on a product itself, even if the prior art product is made by a different process (see In re Thorpe, 227 USPQ 964, (CAFC 1985), In re Brown, 173 USPQ 685 (CCPA 1972), and In re Marosi, 218 USPQ 289, 292-293 (CAFC 1983)).

Specifically, the product-by-process limitation "the filler in the adhesive resin layer rendering the layer porous" is not given patentable weight in product claims.

Chen et al. disclose a lithium ion battery comprising a battery body comprising a positive electrode and a negative electrode each containing an active material and adhesive layers 20 and 30 disposed between the layers of electrode material and the layer of electrolyte active material (the separator, see Figure 2; col. 1, lines 40-52; col. 3, lines 22-40, lines 63-67; col. 4, lines 9-57). The battery body can be wound into a spiral configuration (col. 1, line 30 to col. 2, line 7). The layers of adhesive materials 20 and 30 are likewise may be impregnated or otherwise dispersed therein the electrolyte active species such as  $\text{LiPF}_6$  and  $\text{LiClO}_4$  (col. 4, lines 19-49). Good adhesion between the layers in the battery body can be achieved by compression and heat which is lamination (col. 4, lines 49-57). The filler is the electrolyte species dispersed in the adhesive material. The electrolyte species dispersed in the adhesive material would inherently render the adhesive layer porous. As stated on page 11, last paragraph of the specification, "[a]n inorganic salt, such as  $\text{LiPF}_6$  or  $\text{LiClO}_4$ , that does not dissolve in an electrolytic solution or remains undissolved can served as a filler to form fine pores".

The court has held that claiming of a property or characteristic which is inherently present in the prior art does not necessarily make the claim patentable. *In re Best*, 562 F.2d 1252, 1254, 195 USPQ 430, 433 (CCPA 1977). See also MPEP 2112 and 2112.01. When the

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Examiner has provided a sound basis for believing that the products of the applicant and the prior art are the same, the burden of proof is shifted to the applicant to prove that the product shown in the prior art does not possess the characteristics of the claimed product. *In re Spada*, 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990).

10. Claims 1, 2, 5-7, and 9-12 are rejected under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Hamano et al. (US Pat. No. 6,124,061).

The product-by-process limitations of claims 1, 2, 5-7, and 9-12 are not given patentable weight since the courts have held that patentability is based on a product itself, even if the prior art product is made by a different process (see *In re Thorpe*, 227 USPQ 964, (CAFC 1985), *In re Brown*, 173 USPQ 685 (CCPA 1972), and *In re Marosi*, 218 USPQ 289, 292-293 (CAFC 1983)).

Specifically, the product-by-process limitation "the filler in the adhesive resin layer rendering the layer porous" is not given patentable weight in product claims.

Hamano et al. disclose a lithium ion battery comprising a battery body comprising a positive electrode 7, a negative electrode 9, and a separator 4 and adhesive resin layers 11 between the electrodes and separator 4 (abstract, Figures 1, 5, 7, col. 1, lines 50-60; col. 3, lines 19-23; col. 5, lines 13-37; col. 6, lines 15-26; col. 9, lines 13-15, lines 35-40).

The battery body can be coiled in spiral shape (col. 1, lines 44-60). The porosity of the adhesive resin layer is more than 35% (col. 3, lines 19-22). The components of the battery body are laminated (col. 9, lines 5-15). The pores of the adhesive resin layer contains electrolytic



solution which contains electrolyte species (col. 5, lines 12-30). The electrolyte species can be  $\text{LiPF}_6$ , ad  $\text{LiClO}_4$  which are the fillers in the adhesive resin layer (col. 7, lines 11-25).

Hamano et al. also disclose that that thickness of the adhesive resin layer is preferably less than 0.5 micron (col. 10, lines 4-14).

11. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hamano et al. (US Pat. No. 6,124,061) in view of Dasgupta et al. (U.S. 5,498,489).

Hamano et al. (US Pat. No. 6,124,061) disclose all the limitations of claim 13 (see above) except that the laminate is formed by interposing the positive electrode and the negative electrode alternately between folded separators.

Dasgupta et al. teach a laminate formed by interposing the positive electrode and negative electrode alternately between folded separators to form a continuous, flexible structure that provides for a large area contact between the electrode and the electrolyte to given higher current density without the disadvantages of a coiled structure which has a smaller radii and tightly curving surfaces that put substantial mechanical stress on the electrode layers and result in reduced efficiency of the coiled structure (col. 1, lines 34-57).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have the battery of Hamano et al. (US Pat. No. 6,124,061) having a laminate structure formed by interposing the positive electrode and the negative electrode alternately between folded separators instead of a coiled structure disclosed because a laminate formed by interposing the positive electrode and negative electrode alternately between folded separators

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form a continuous, flexible, structure that provides for a large area contact between the electrode and the electrolyte to given higher current density without the disadvantages of a coiled structure which has a smaller radii and tightly curving surfaces that put substantial mechanical stress on the electrode layers and result in reduced efficiency of the coiled structure as taught by Dasgupta et al.

12. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chen et al. (US Pat. No. 5,741,609) in view of Dasgupta et al. (U.S. 5,498,489).

Chen et al. (US Pat. No. 5,741,609) disclose all the limitations of claim 13 (see above) except that the laminate is formed by interposing the positive electrode and the negative electrode alternately between folded separators.

Dasgupta et al. teach a laminate formed by interposing the positive electrode and negative electrode alternately between folded separators to form a continuous, flexible structure that provides for a large area contact between the electrode and the electrolyte to given higher current density without the disadvantages of a coiled structure which has a smaller radii and tightly curving surfaces that put substantial mechanical stress on the electrode layers and result in reduced efficiency of the coiled structure (col. 1, lines 34-57).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have the battery of Chen et al. (US Pat. No. 5,741,609) having a laminate structure formed by interposing the positive electrode and the negative electrode alternately between folded separators instead of a coiled structure disclosed because a laminate formed by

interposing the positive electrode and negative electrode alternately between folded separators form a continuous, flexible, structure that provides for a large area contact between the electrode and the electrolyte to given higher current density without the disadvantages of a coiled structure which has a smaller radii and tightly curving surfaces that put substantial mechanical stress on the electrode layers and result in reduced efficiency of the coiled structure as taught by Dasgupta et al.

13. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over WO 97/08763 (equivalent document US Pat. No. 6,287,720 B1 relied upon for translation) in view of Dasgupta et al. (U.S. 5,498,489).

WO 97/08763 (equivalent document US Pat. No. 6,287,720 B1 relied upon for translation) discloses all the limitations of claim 13 (see above) except that the laminate is formed by interposing the positive electrode and the negative electrode alternately between folded separators.

Dasgupta et al. teach a laminate formed by interposing the positive electrode and negative electrode alternately between folded separators to form a continuous, flexible structure that provides for a large area contact between the electrode and the electrolyte to given higher current density without the disadvantages of a coiled structure which has a smaller radii and tightly curving surfaces that put substantial mechanical stress on the electrode layers and result in reduced efficiency of the coiled structure (col. 1, lines 34-57).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have the battery of WO 97/08763 having a laminate structure formed by interposing the positive electrode and the negative electrode alternately between folded separators instead of a coiled structure disclosed because a laminate formed by interposing the positive electrode and negative electrode alternately between folded separators form a continuous, flexible, structure that provides for a large area contact between the electrode and the electrolyte to given higher current density without the disadvantages of a coiled structure which has a smaller radii and tightly curving surfaces that put substantial mechanical stress on the electrode layers and result in reduced efficiency of the coiled structure as taught by Dasgupta et al.

#### *Response to Arguments*

14. Applicant's arguments filed 3/22/2004 have been fully considered but they are not persuasive.

*With respect to Chen et al. of record, applicant asserts that the reference fails to disclose the presence of a filler, although the patent teaches that the adhesive layer may be porous and that even though porosity is mentioned in the patent, there is no disclosure in the reference as to the significance of the porosity.*

In response, applicants themselves have stated on page 11, last paragraph of the specification that "[a]n inorganic salt, such as  $\text{LiPF}_6$  or  $\text{LiClO}_4$ , that does not dissolve in an electrolytic solution or remains undissolved can served as a filler to form fine pores." Once the electrolyte

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salt dissolves in applicant's disclosure, the electrolyte salt which is disclosed as a filler would not be present in the adhesive layer anymore once it forms fine pores in the adhesive resin layer.

Chen et al. disclose that the electrolyte active species can be  $\text{LiClO}_4$  and  $\text{LiPF}_6$  (col. 4, lines 20-25) in the adhesive resin layer and product-by process limitations are not given patentable weight in product claims.

*With respect to art rejections based on Hamano et al. (US Pat. No. 6,124,061), applicant asserts that there is absolutely no teaching or suggestion of an adhesive layer containing filler particles which increase passage spaces within the adhesive layer for the passage of lithium ions therethrough and that because the reference does not teach the use of a filler in the adhesive resin layer, it is impossible to form many through holes in the layer, that is, the porosity of the layer is low.*

In response, the Examiner would like to remind applicants again that the present claims are product claims and not process claims and the method by which the porosity of the adhesive layer is achieved in the product claims is not given patentable weight in product claims. Furthermore, applicants themselves have stated on page 11, last paragraph of the specification that "[a]n inorganic salt, such as  $\text{LiPF}_6$  or  $\text{LiClO}_4$ , that does not dissolve in an electrolytic solution or remains undissolved can served as a filler to form fine pores." Once the electrolyte salt dissolves in applicant's disclosure, the electrolyte salt which is disclosed as a filler would not be present in the adhesive layer anymore once it forms fine pores in the adhesive resin layer.

The Examiner disagrees with applicants' assertions that the porosity of the adhesive resin layer of Hamano et al. is low since Hamano et al. specifically discloses at col. 3, lines 19-22 that the porosity of the adhesive resin layer is more than 35%.

*Allowable Subject Matter*

15. Claim 15 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action.
16. Claims 16-26 and 28 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.
17. The following is a statement of reasons for the indication of allowable subject matter:

With respect to claims 15-26 and 28, the closest prior art of record, Kawakami et al. (US 5,824,434) disclose inorganic and organic material as insulating layer materials between the negative electrode and separator and a conductive layer between the insulating layer and the separator, the reference does not disclose, teach, or suggest that the insulating layer materials including the conductive layer make up a porous adhesive resin layer that binds the negative electrode to the separator.

*Conclusion*

18. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Gozdz et al. (US 5,840,087) discloses the lamination of a plurality of unit cells in a lithium ion battery.

19. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

20. Any inquiry concerning this communication or earlier communications should be directed to examiner Susy Tsang-Foster, Ph.D. whose telephone number is (571) 272-1293. The examiner can normally be reached on Monday through Friday from 9:30 AM to 6:00 PM.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached at (571) 272-1292.

The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

st/ 

Susy Tsang-Foster  
Primary Examiner  
Art Unit 1745